

COMMENTARY

# Critical prerequisites for Covid-19 vaccine acceleration: A developing economy perspective

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This study aims to explore the critical prerequisites for accelerating the distribution of the COVID-19 vaccine in developing countries by using Ghana as a case study. A qualitative study method and content analysis approach was used. In-depth interviews were conducted with health experts from the Ghana Health Service, World Health Organization (WHO), AstraZeneca, Novartis, and Medtronic Inc. in Ghana. Our analysis of data revealed that new structures, committees, advisory bodies and lines of communication in government evolved during this pandemic and are underlying the current strategy development and decision-making on COVID-19 vaccines. The interviews gave insights into six major factors that will aid COVID-19 vaccine acceleration in Ghana. These factors are: (1) Access to vaccines through delivery, (2) national manufacturing of vaccines, (3) choosing the best vaccine candidates, (4) financial resources, (5) transparency, and (6) vaccine roll-out and administration. These results could guide policymakers and other relevant stakeholders in prioritizing activities that will aid COVID-19 vaccine acceleration in Ghana and other lower-middle-income countries, tailored to their specific context. As a recommendation, the Ghanaian government should embrace a multisectoral synergy approach to fight the disease. The study also provides insights into how vaccine adoption can be accelerated in the case of future pandemics.

## KEYWORDS

COVAX, Covid-19, education, Ghana, vaccine

## 1 | INTRODUCTION AND BACKGROUND

There is no doubt that the COVID-19 pandemic brought countries to an economic and social halt around the world (Mogaji & Nguyen, 2020). However, some countries and certain sectors were harder hit than others. Developing countries were undeniably crippled by the prolonged lockdowns due to the pandemic, and disparities between the developed and developing world continue to mount as evidenced by the uneven access and distribution of the COVID-19 vaccine. Like many countries in Africa, Ghana is currently experiencing a second wave of infections (Quakyi et al., 2021; Salyer et al., 2021). Ever since the country reported its first two cases on March 12, 2020, there have been cases reported in all of its 16 administrative regions (Sarpong & Obeng, 2020). Between March 2020 and the end of April

2021, a total number of 92,740 positive cases was reported, and out of this, there have been 1584 active cases, 780 deaths, and 90,376 recovered/discharged cases (Ghana Health Service, 2021). While Ghana has one of the best responses to COVID-19 on the continent, there is still a need for improvement with regard to testing, reporting, and contact tracing (Quakyi et al., 2021). Furthermore, continuing prevention measures (lockdown, distancing, and masks) will be necessary until herd immunity is reached. Best local solutions will vary according to the specific situation (Boum et al., 2021; Salyer et al., 2021). Focusing on Ghana, we can acknowledge that the country has done a good job in reacting swiftly to the COVID-19 outbreak in March and April 2020. However, with the decline of incidences, it has become apparent that a robust surveillance system is still missing and the risk communication offers some room for improvement. The second wave of

infections has raised questions concerning the sustainability of taking preventive measures, creating pressure for the government to create effective vaccine campaigns as a prerequisite for vaccinating the population. This is posing new questions about the access to vaccines, the preparedness of the Ghanaian population to be vaccinated, and the technical and organizational readiness to implement a well-organized vaccination campaign.

In late February 2021, Ghana received the first batch of 600,000 AstraZeneca vaccine doses through COVAX, another 50,000 as a donation from India, and 165,000 vaccine doses from Mobile Telecommunication Network (MTN) through bilateral negotiations, and managed to administer all doses by the end of March 2021 (Harant et al., 2021). However, there is an urgent need for more vaccine doses to cover at least 60% of the Ghanaian population to achieve herd immunity.

Even though more than 170 vaccine candidates have been developed against COVID-19 and several have obtained market authorizations, access to them is limited for most low- and lower-middle-income countries, most of which have yet to roll out full-scale vaccination campaigns (Acharya et al., 2021; Excler et al., 2021; Nachega et al., 2021). To prevent lower-middle-income countries from being left behind, governments, international organizations, philanthropists, civil society, and other stakeholders have come together with an initiative designed to ensure the research, development and manufacture of a wide range of COVID-19 vaccine candidates (Soares, 2020). This initiative called COVAX is one of the three pillars of the “Access to COVID-19 Tools (ACT) Accelerator,” which is coordinated by the World Health Organization, the Coalition for Epidemic Preparedness Innovations, and GAVI, as well as UNICEF, which is actively involved in vaccine delivery (COVAX, 2020). The basic idea behind COVAX is to bring countries and economies together to pool resources, support the development and manufacture of candidate vaccines and ensure equitable distribution to countries that might otherwise be left behind (Soares, 2020). Equal access to a COVID-19 vaccine is the key to beating the virus because “nobody is safe until everybody is safe.” Countries participating in the COVAX Facility, a global risk-sharing mechanism for pooled procurement and equitable distribution of COVID-19 vaccines, will benefit from the assurance that the Facility can supply them with enough vaccine doses to immunize 20% of their country's population (healthcare workers and the most vulnerable groups) (Portfolio, 2021). For lower-income countries, the cost of vaccines will be co-financed through development aid and philanthropic organizations (Herlitz et al., 2021; Nkengasong et al., 2020).

However, the doses delivered through COVAX will not be sufficient to achieve widespread coverage in a timely manner. In fact, it has been estimated that most lower-middle-income countries will not achieve widespread coverage until late 2022 or even early 2023 (Demarais, 2021). Although the Ghanaian government stated widespread coverage in the country could be reached by October 2021 (Quakyi et al., 2021), there is currently a significant vaccine shortage, which cannot be remedied by relying solely on vaccine doses supplied from COVAX and the African Union initiative, AVATT. Developing a pandemic vaccine strategy is a dynamic process that is urgently needed and currently unfolding in many countries (Lancet, 2020).

There is no blueprint on how lower-middle-income countries can best access COVID-19 vaccines in a timely manner. With rich nations buying up billions of doses before vaccines are even approved, there is a lot of concern that the lack of adequate financial resources could delay the procurement of the vaccine by low-income countries (Nhamo et al., 2021). In this paper, we endeavor to understand the structures, processes, and factors influencing the national vaccine strategy in Ghana and identify enablers and barriers to better access, including the preparedness of the Ghanaian population and the health system for an effective campaign.

## 2 | RESEARCH QUESTION

The main goal of this article is to make a vital contribution to the literature by highlighting some essential conditions that can aid the acceleration of COVID-19 vaccine delivery and uptake in a developing economy like Ghana. Based on the discourses overviewed in the introduction, we decided to concentrate on the research question: what are the prerequisites for a successful COVID-19 vaccination campaign in Ghana? The focus will be on the issues of access to vaccines in the global context as well as on national and local conditions.

## 3 | OBJECTIVES

We aimed to learn about the positions of Ghanaian experts on vaccines and the implementation of COVID-19 vaccination programs. Their responses were analyzed in the context of the discussion on vaccination in developing economies, with an ultimate interest in identifying the critical prerequisites for accelerating vaccine uptake and identifying vaccination obstacles, thereby contributing to the smooth and rapid completion of the process.

## 4 | METHODOLOGY

### 4.1 | Method

We conducted five semi-structured in-depth interviews (in one case carried out as a small-group interview), including eight major stakeholders in COVID-19 vaccine production, supply, distribution, and acquisition/procurement. This method allowed the researchers to gain insight into current development issues related to COVID-19 vaccine acceleration. An interview guide was used to lead the discourse during the semi-structured interviews and sent to the stakeholders beforehand to allow them to have a fair idea of the expected questions.

### 4.2 | Participants selection for expert interviews

Relevant experts were identified from an initial scoping of information on COVID-19 vaccinations in Ghana. Using the snowball technique,

interviewees recommended further experts with whom interviews were then scheduled. In achieving the study's objective, we reached out to experts with more relevant information on the current happenings on COVID-19 issues in Ghana. Eight experts were interviewed from January to March 2021. Seven of the participants were from the Greater Accra region and one from the Volta region in Ghana. The Experts had the following affiliations: Ghana Health Service, Ghana Academy for Arts and Sciences, World Health Organization (WHO) Ghana, AstraZeneca Ghana, Novartis Ghana, and Medtronic Inc. in Ghana (Table 1). The interviews were carried out in English. Due to the social distancing protocols, interviews were conducted via Zoom, each lasting 45–60 min. Interviews were digitally recorded by the meeting host on a password-protected laptop and later transcribed.

### 4.3 | Data analysis

A qualitative content analysis was used for data analysis. According to Bengtsson (2016), the use of content analysis permits the researcher to analyze and interpret data using themes deductively and/or inductively. The analytical process included transcribing, organizing and grouping the data into identified themes. Data were thoroughly examined, and saturation was reached when no new themes were observed.

### 4.4 | Desk reviews

We conducted a desk review for both peer-reviewed and gray literature, including news reports on COVID-19 vaccinations in Ghana. Keywords such as “COVID-19,” “COVID-19 vaccine,” “COVID-19 vaccine acceleration,” “COVID-19 vaccine delivery in Africa,” and “COVID-19 vaccination in a developing country” were used in the Google scholar search engine.

## 5 | RESULTS

Our analysis of data revealed six main thematic clusters that need to be addressed to aid COVID-19 vaccine acceleration. The interviews of Participant 1, 2, and 3 also revealed new structures, committees, advisory bodies, and lines of communication in government that evolved while developing and implementing Ghana's COVID-19 vaccine strategy (see Table 2 and Figure 1). As a result of the COVID-19 pandemic, new structures emerged (linked to older institutions such as the Expanded Programme on Immunization, EPI) which are playing a vital role in the current vaccine strategy, such as the sub-committee in charge of vaccine development and manufacturing. In Table 2 we specify the responsibilities and resources of each body/committee.

### 5.1 | Emerged themes

In exploring the perspectives of the experts regarding the critical factors for COVID-19 vaccinations in Ghana, six major themes emerged:

**TABLE 1** Description of key experts

Participant	Function	Affiliated institution
1	Policy maker	Ghana Health Service
2	Scientist and Public Health Practitioner	Ghana Academy of Arts and Sciences
3	Scientist and Public Health Practitioner	Ghana Academy of Arts and Sciences
4	Researcher	World Health Organization (WHO) Ghana
5	Manufacturer	AstraZeneca Ghana
6	Pharmacist	Novartis Ghana
7	Pharmacist	Mater Ecclesiae Hospital, Ho
8	Researcher	Novartis

1. Access to vaccines through import.
2. National manufacturing of vaccines.
3. Choosing the best vaccines candidates.
4. Financial resources.
5. Transparency.
6. Vaccine roll-out and administration.

#### 5.1.1 | Theme 1: access to vaccines through import

In the short-term, access to vaccines in Ghana depends on imports. The experts, when asked what should be done to accelerate Covid-19 vaccination, discussed two sub-themes: Delivery through COVAX and bilateral negotiations.

##### *Sub-theme: COVAX*

Ghana's participation in COVAX is crucial for getting access to a guaranteed quantity of COVID-19 vaccines, being paid through the COVAX facility. It has been clear to all experts that COVAX provides the best way for developing economies to have comparatively early and subsidized access to significant batches of vaccines. The following quotes were taken from the interviews:

“...We need to engage COVAX; I mean Ghana should try and get as much vaccine as it can from the COVAX facility.” Participant 2.

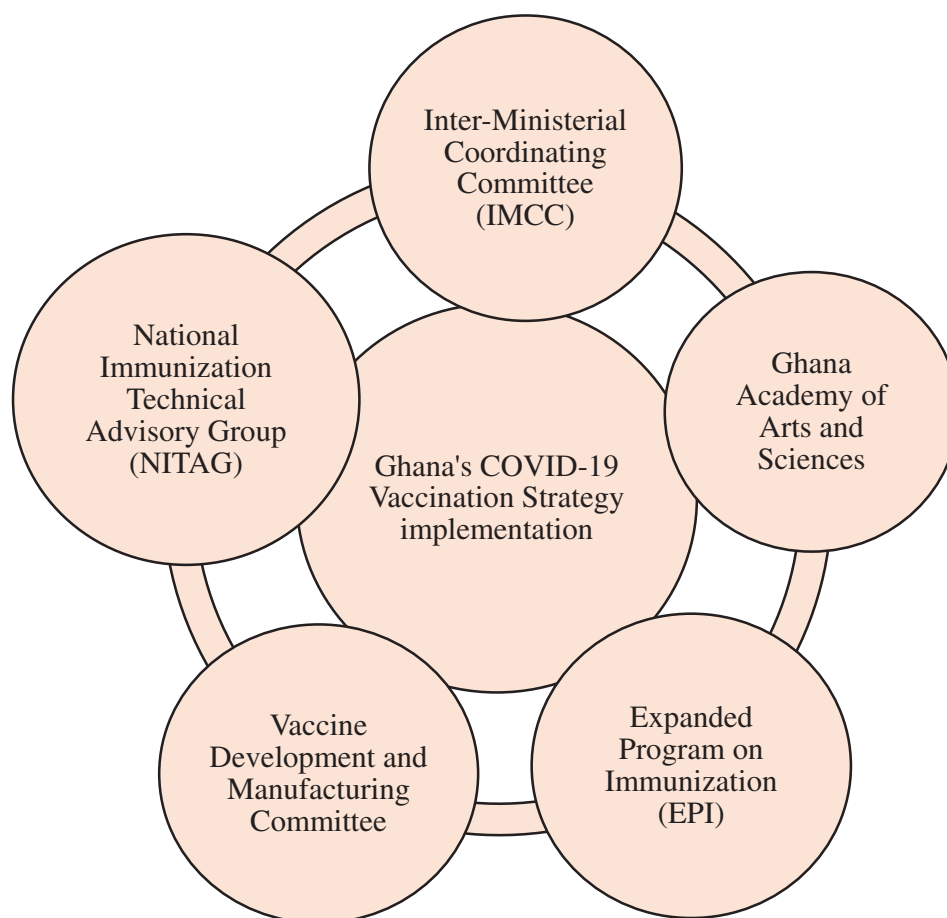
“WHO has together with GAVI and other institutions around vaccine procurement put the COVAX facility together to support countries that may not be able to have direct access to these from the manufacturers as well as to negotiate for competitive pricing from these countries” Participant 4.

##### *Sub-theme: Bilateral deals*

Because of the limitation of COVAX to provide vaccine doses to immunize 20% of each country's population, it has also been emphasized by the experts that procuring additional vaccines through bilateral negotiations would be necessary to achieve the target of reaching the herd immunity to prevent the country from being hit by recurring

**TABLE 2** Committees/bodies involved in developing the current vaccine strategy

	Responsibilities	Contributions/resources during COVID-19 pandemic
Ghana Academy of Arts and Sciences	To encourage the pursuit, advancement, and dissemination of knowledge in all fields of science and humanities. They come up with policy documents for national development through the promotion of learning.	"GAAS COVID-19 vaccines position paper" (2021).
National Immunization Technical Advisory Group (NITAG)	Provides independent, evidence-based guidance on vaccines and the immunization process, resulting in a reduction in vaccine-preventable diseases in the long run.	COVID-19 vaccination strategy.
Inter-Ministerial Coordinating Committee (IMCC)	Responsible for coordinating COVID-19 response activities.	COVID-19 response activities (i.e., lockdown, social distance, covid-19 hand washing protocols, wearing of mask).
Vaccine development and manufacturing committee	Produce an action plan on how the country can develop and manufacture its vaccines for COVID-19. Ensure vaccines deployed into the country are safe.	Vaccine development and manufacturing plan.
Expanded programme on immunization (EPI)	To assess and evaluate that health activities are in accordance with plan and regulations.	Vaccination campaign strategies.

**FIGURE 1** Overview of key stakeholders in implementing COVID-19 vaccine in Ghana

waves of the pandemic and from bearing the high social and economic costs of periodic lockdowns:

"Apart from the COVAX channel, some developing countries are making bilateral arrangements with ... China and a few other manufacturers, and Ghana is not an exception." Participant 4.

"The second wave of the pandemic in Ghana has led to a lot of deaths in the country. This has really affected us. Hence, Ghana as a country must not just rely on COVAX as a sole source for the vaccine." Participant 2.

"...Ghana is exploring other opportunities of working with the African Union and ECOWAS so we can access all possible vaccines." Participant 1.

### 5.1.2 | Theme 2: national manufacturing of vaccines

The Ghanaian government is dedicated to exploring the possibilities of manufacturing COVID-19 vaccines locally. This initiative is seen as a medium-term perspective to supplement efforts by the COVAX facility. On February 24, 2021, the Government of Ghana set up a committee to oversee vaccine development and manufacture in the country.

The following quotes give more details on Ghana's intention to manufacture its vaccines, possibly in cooperation with other West-African countries:

*"...Yes, we have a lot of drug manufacturing companies. They have identified three very successful companies who could be part of this, so it is a serious discussion in the country, that we should be capable of developing the resource, infrastructural resource, and human capacity to make our own vaccine".* Participant 3.

*"...it is a ...medium-term idea for the ECOWAS region; there is a group that has been formed trying to look at how to be able to produce a vaccine in the ECOWAS region."* Participant 1.

### 5.1.3 | Theme 3: choosing the best vaccine candidates

Though Ghana had few options concerning the choice of vaccines received in February/March 2021, there has been an in-depth discussion concerning the probable impacts of different types of vaccines on the country. Factors like cost, necessary temperatures of storage, storage capacity, and transportation were considered. The excerpts from the interviews below provide a snapshot of stakeholders' viewpoints about the key requirements for choosing the best vaccine for Ghana.

*"You see, as I said, there are quite a number of vaccine candidates, but the issue is which one fits."* Participant 1.

*"We looked at the cost of all the vaccines, the ease of storage and administration, and recommended to Ghana health service they should look at the AstraZeneca vaccine. The AstraZeneca vaccine can be stored at four degrees centigrade in an ordinary fridge. So that made it an attractive option."* Participant 2.

*"...I believe other nine candidate vaccines which are still undergoing trials are going to be monitored and then explored, once they can pass the various security checks and they are safe for use, I am sure they'll be brought on board."* Participant 4.

### 5.1.4 | Theme 4: financial resources

Acquiring sufficient vaccines is the first and foremost financial challenge for many developing countries. To accelerate the COVID-19 vaccine in Ghana, there is a need for the country to put in more financial resources. In support of the above discussion, the informants expressed that:

*"Procuring more vaccines is going to cost this country a lot of money. So, we need to ensure proper planning of our financial resources. I think that once this is sorted, we should be getting through".* Participant 5.

*"...to achieve herd immunity ... there will be the need for innovative ways in securing access through whatever channels or corporations, bilateral, multilateral agreements and how to negotiate prices because of course many countries cannot just spend anything; to reach herd immunity, the country needs to find the financial resources to buy more vaccines doses."* Participant 2.

### 5.1.5 | Theme 5: transparency by government and health workers in their line of action

Participants mentioned that transparency was crucial concerning which vaccines will be purchased when they will arrive, who will receive the vaccines, and which stakeholders will be responsible for vaccine manufacturing and administration. This needs to be made known for optimizing coordination and acceptance in the population. These are some of the reasons that participants provided as to why transparency was important:

*"...We need transparency in the line of action; in terms of defining who the key stakeholders are, when it comes to the implementation of COVID-19 vaccines in Ghana."* Participant 7.

*"The administrative lines of reporting (ministerial and technical) within the government on COVID-19 needs to be clear. I mean in accessing the COVID-19 vaccines, the public should know that no doctor's clinic or any private entity can go out and buy or bring any vaccine."* Participants 3.

### 5.1.6 | Theme 6: vaccine roll-out and administration

In accelerating access to the COVID-19 vaccine, the roll-out of the vaccine in Ghana will involve many stakeholders within and beyond those in the health sector and should map out eligibility criteria for prioritizing segments of the population in the vaccination process.

#### *Subtheme: training of vaccinators and health workers on COVID-19 vaccination*

In developing countries like Ghana where the health worker to patient ratio is low, training more vaccinators will ensure that vaccines are administered to all, including those living in poor and hard-to-reach communities. Training of vaccinators will also ensure that the vaccines are delivered safely. The experts have this to say concerning the sub-theme:

*"...health personnel like nurses, doctors and pharmacists should be trained on how to administer the COVID-19 vaccine."* Participant 7.

*"The management of the COVID-19 disease should be done by highly skilled health personnel like infectious disease specialists, however, due to the inadequate human resource capacity in the country, nurses and doctors could be trained to work in their place."* Participant 1.



*Subtheme: infrastructure*

In the rollout of the COVID-19 vaccination program in Ghana, there is a need to improve the country's infrastructure. The excerpts below throw more insight into why infrastructure development is urgently needed to vaccinate the majority of the population.

*"Aside from safety, the next criteria [is] dependent on the availability of the characteristics that fit our cold chain. In response, the Government of Ghana has plans of improving the country's current cold chain infrastructure."* Participant 1.

*"...The lack of infrastructure in Ghana makes it difficult for the at-risk population living in deprived communities to get access to the COVID-19 vaccines. The realization of trying to immunize 600,000 people demands that there is enough infrastructure and resources to support the vaccination process."* Participant 3.

*Subtheme: prioritization*

The experts also agreed that vaccine administration and health system should be prioritized due to the limited number of doses received (in the short-run) from COVAX and other sources and be based on need due to the healthcare deficiencies, respectively. COVAX makes this a requirement for delivering vaccines.

*"...countries like Ghana can start prioritizing healthcare and then make some modest investments in our healthcare system to make it robust enough to face any future pandemic."* Participant 6.

*"So, any governments' priority, first of all, is to safeguard the protection of frontline workers, the aged, and then the vulnerable."* Participant 8.

*"...the vaccines are literally in short supply and so we'll have to prioritize how we use whatever is obtained. I believe that will be the approach most of the government will use until such a time that some of the middle-income countries can produce their vaccine, this will be the only way to go for now."* Participant 4.

*"...in terms of the prioritized populations, we are looking at health workers, ... people aged 60 years and above and then we are looking at persons with underlying co-morbidities as next in line in taking the vaccines and other essentials. So we have tried to get a prioritized list of persons that would be the initial set of persons to get the vaccines which are to occur."* Participant 1.

*Subtheme: community engagement*

Community engagement is the center of any public health intervention. And so, for communities to accept the COVID-19 vaccine, the government must engage them from the start of the process to the end, and, among others, prevent the rise of conspiracy theories. This also applies to the acceptance of preventive measures, the so-called COVID protocols (wear a mask, keep distance, wash your hands, etc.)

*"In communities in Ghana, issues about the vaccines causing problems and [being intentionally] designed as anti-fertility, anti-ageing, and [aimed to] reduce [worldwide] the size of the black population were major concerns that went around. Therefore, it will be better for government to engage the community by communicating in different languages using different ways [to emphasize] on the importance of the COVID-19 vaccine."* Participant 2.

*"So, what I think we need to do as a country is to be able to heighten our communication talking about the benefits of the vaccines as opposed to possible side effects. There are a few anti-vaccine campaigners in the country, but I think that they are not loud enough, and I think that, if our communication team is very effective, we can get the Ghanaian to fully be on board. We are also engaging reasonable stakeholders so that, they see the benefits of the COVID-19 vaccine."* Participant 1.

*"...the non-vaccine COVID protocols, do work. Every country has shown it worked, New Zealand has shown it worked, Australia has shown it worked, South Korea has shown it worked, people that have used the non-vaccine protocol have shown that you have to have a disciplined people."* Participant 3.

## 6 | DISCUSSION—EXPLORING THE CRUCIAL FACTORS FOR A SUCCESSFUL VACCINATION CAMPAIGN

The analysis of the expert's perspective revealed concurrent views on COVID-19 vaccine acceleration in Ghana, allowed a comprehensive overview on crucial problems, and point to some factors that are frequently not included in discourses on vaccination. Taking into account that it will take a considerable time to achieve the herd immunity in Ghana through vaccination, preventive measures will continue to be crucial for preventing a catastrophic impact of COVID-19 before the pandemic will be under control; in particular, as new mutations seem to affect younger people more seriously (Challen et al., 2021).

Numerous points were cited by the experts which reflected prior studies (Montagni et al., 2021; OECD, 2021; Sharma & Pardeshi, 2021). They highlighted the essential role of COVAX as well as bilateral negotiations as means through which Ghana could access enough COVID-19 vaccines for its citizens (OECD, 2021). The COVAX facility represents the only effort to ensure that both developed and developing economies get fair and equitable access to a basic quantity of COVID-19 vaccines, regardless of their ability to pay (Boum et al., 2021). The hope is that this level of distribution will be sufficient to protect those at the highest risk of getting the disease and dying from it. Nevertheless, the respondents agreed that for reaching the herd immunity on time, it would be necessary to negotiate an additional delivery of vaccines through bilateral negotiations. This finding resonates with the assertion of Boum et al. (2021) who are of the view that the COVID-19 vaccine from COVAX alone will not be sufficient to cover the requirements for countries in Africa. In addition, some respondents referred to the perspectives of manufacturing COVID-19 vaccines in Ghana, possibly in cooperation with other producers in the ECOWAS region. This indicates a trust in local manufacturing capacities, which corroborates with information collected by the Committee on vaccine development and manufacturing (see Figure 1).

Experts pointed to research done about the choice of vaccines to fit the conditions in Ghana, taking into account the considerable number of new vaccine candidates that are currently being tested (Nachega et al., 2021). The Ghana Academy of Arts and Sciences has produced in-depth information on a comparative analysis of vaccines

(GAAS COVID-19 vaccines position paper, 2021). Considering Ghana's current cold chain infrastructure and the costs of importing vaccines beyond COVAX, there is a preference for the AstraZeneca vaccine, which is offered at a lower price than others and can be stored and transported in a refrigerated (as opposed to frozen) condition.

Likewise, financial resources were listed as one issue that could derail access to enough COVID-19 vaccines in Ghana. In combating the COVID-19 pandemic, Ghana will be dependent on donations (such as that from MTN, see Section 1) and on support from international organizations including the World Bank Group Ghana which has committed \$100 million in tackling the pandemic (World Bank, 2020). In addition, the costs of 11.2 billion Ghanaian cedis (equivalent to \$1.9 billion) was incurred by the Ghanaian government in 2020 to control the transmission of the virus and the effects of its occurrence (Sasu, 2021). Unequal access to the COVID-19 vaccine represents global socioeconomic inequalities in health care that must be addressed (Boum et al., 2021). It has to be taken into account that not only buying vaccines through bilateral negotiations but also the vaccination campaigns in the country will need a considerable amount of financial resources. It is estimated that the cold chain alone contributes to as high as 80% of all vaccination costs (Matthias et al., 2007). In essence, most developing countries will have to rely on financial support from other countries, nongovernmental organizations, and other organizations such as the World Bank Group and the International Monetary Fund to finance full-scale vaccination campaigns.

An important point made in the interviews relates to transparency, an aspect frequently omitted in research on vaccination campaigns. Transparency by government and healthcare workers in their line of action was emphasized by the experts as a necessary condition that needs to be taken into consideration. To ensure that citizens in a developing country such as Ghana get access to the COVID-19 vaccines, government agencies presented in the introductory part of Section 5 need to be more transparent about all negotiations, decisions, budget, support funds, and information dissemination around the vaccine. Leaders need to prepare and plan strategies to promote effective and equitable COVID-19 vaccine delivery and also promote vaccine acceptance (Weintraub et al., 2021). When there is transparency, it helps build some level of trust in the government and also contributes to higher vaccine acceptance. Political will is also essential in accelerating COVID-19 vaccine access in developing countries. Vaccine projects like the Meningitis vaccine project and the Global Polio Eradication Initiative were successful because of strong political will and powerful efforts from the government (Weintraub et al., 2021). As vaccine deployment will be a rather slow process due to limited availability, governments need to generate enough political will to allocate and distribute COVID-19 vaccines equitably within the country (Weintraub et al., 2021).

Vaccine rollout and administration were stated by the experts as a requirement to accelerate access to the COVID-19 vaccines. A number of issues are well known, such as the necessary training of vaccinators and health workers, and the preparation of the infrastructures required, in particular a reliable cold chain (Wang et al., 2020; Hanson

et al., 2017). The Pfizer/BioNTech and Moderna vaccines require a storage temperature of  $-70^{\circ}$  and  $-20^{\circ}$ , respectively, which cannot be supported by the country's current cold chain infrastructure. When health care workers are trained and equipped with the needed skills in COVID-19 vaccine administration, they can also play an important role in providing education and counseling to citizens (see: sub-theme "Community engagement"), and this will promote vaccine acceptance among the population (Weintraub et al., 2021).<sup>6</sup>

Lastly, there is a lot of misinformation and low community engagement or awareness about COVID-19 in Ghana. This includes two aspects: (a) a lack of consciousness about the need to continue preventive measures (lockdown, distancing, and masks) and (b) negative attitudes toward vaccination. The amount of fake news circulating on social media and misbeliefs such as COVID-19 vaccines causing the disease, instead of preventing transmission has made people feel hesitant about getting vaccinated. Vaccine hesitancy has been named as one of the top 10 threats to global health by the WHO (, 2019). Doubts about vaccine safety and effectiveness, in general, have also been reported and is an important factor impeding the uptake of the COVID-19 vaccine in Ghana. This discovery confirms the assertion that public education and grass-root engagements can help to build the trust of citizens to go in for the COVID-19 vaccine (Vergara et al., 2021).

## 7 | CONCLUSIONS

The economies of most African countries have been severely hit by COVID-19 measures. The ability to access larger batches of vaccines as well as to provide the logistics for a comprehensive vaccination campaign within a few months depends on international support. In the case of countries in a difficult financial situation, there might be a trade-off between strategies to speed up access to vaccines and to prepare for effective vaccination campaigns; here, the role of international cooperation is of paramount importance. Unfortunately, due to the limited availability of the COVID-19 vaccine and uneven global economic and political relations, a large part of the global population is excluded from timely access. Collective action for the production, distribution and delivery of vaccines depends on technical capacities, political organization, and international cooperation. The interviews with Ghanaian experts reveal that they are very conscious of this situation and that the country is willing to act on the critical factors for accelerating COVID-19 vaccination in Ghana. The consensus is that developing countries like Ghana need to start prioritizing health care and make more than modest investments in their healthcare system.

## AUTHOR CONTRIBUTIONS

All authors contributed to the final manuscript. Robert E. Hinson and Wolfgang Hein conceptualized the idea and provided technical guidance. Louis N. Tettey and Betty A. Nartey drafted the manuscript with input from all authors. Anne Harant and Wolfgang Hein provided critical feedback, revision and helped shape the manuscript. Nicole S. Struck and Julius N. Fobil did the final review and approval for the version to be published.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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**How to cite this article:** Hinson, R. E., Hein, W., Tettey, L. N., Nartey, B. A., Harant, A., Struck, N. S., & Fobil, J. N. (2021). Critical prerequisites for Covid-19 vaccine acceleration: A developing economy perspective. *Journal of Public Affairs*, e2723. <https://doi.org/10.1002/pa.2723>